AMENDMENTS TO THE CLAIMS

1-20. (Cancelled)

21. (New) An interconnect structure comprising:

a plurality of interconnected nodes including a first node having first and second input ports and first and second output ports;

all output ports accessible from the first input port being accessible from the second output port;

a plurality of output ports that are accessible from the second input port but not from the first output port; and

a routing logic included within the interconnect structure to assure that when a second message arrives at the first input port and simultaneously a first message arrives at the second input port there is a path through the second output port to a target destination for the first message;

wherein at least one of the plurality of nodes is adapted to simultaneously receive a plurality of messages;

wherein said routing logic assures that the first message is not blocked from using the first output port and the second message is not blocked from using the second output port; and

wherein said routing logic for the routing of the first and second messages depends in part on QOS criteria.

22. (New) An interconnect structure comprising:

a plurality of interconnected nodes including the first, second, third, fourth, and fifth nodes, each of the first, second, third, fourth and fifth nodes having a plurality of input ports and a plurality of output ports, and the third node being positioned to receive messages from the first and second nodes and to route messages to the fourth and fifth nodes;

a plurality of interconnect structure output ports including an output port that is accessible from the third node but not the fifth node;

a routing logic included within the interconnect structure to assure that when the first node sends a first message to the third node and concurrently the second node sends a second message to the third node, then the third node can route a first message through the fourth node to a target interconnect structure output port for a first message and the third node can route a second message through the fifth node to a target interconnect structure output port for the second message;

wherein at least one of the plurality of nodes is adapted to simultaneously receive a plurality of messages;

wherein said routing logic assures that the second message is not blocked from the fifth node and the first message is not blocked from the seventh node; and

wherein said routing logic is responsive to QOS criteria.

23. (New) An interconnect structure, comprising:

a plurality of interconnected nodes, including a first node and a second node;

the first node having a plurality of data input ports, a plurality of data output ports, and a control signal input port; and

the second node having a plurality of data input ports, a plurality of data output ports, and a control signal output port; and

a routing logic associated with the nodes, the routing logic for routing data selectively among the interconnected nodes;

the first and second nodes being positioned in the interconnect structure so that the first node cannot route data to the second node, the second node cannot route data to the first node, and no node exists in the interconnect structure that can have data routed directly to it from both the first node and the second node;

a logic included as part of said routing logic and associated with the first node that uses information concerning routing of data through the second node to route data through the first node;

wherein at least one of the plurality of nodes is adapted to simultaneously receive a plurality of messages;

the plurality of interconnected nodes further including a third node distinct from the first and second nodes, the third node having a plurality of data input ports, a plurality of data output ports, and a control signal output port; and

the first and third nodes are positioned in the interconnect structure so that the first node cannot route data to the third node, the third node cannot route data through the first node, and no node exists in the interconnect structure that can receive data directly routed both from the first node and the third node;

the logic associated with the first node uses information concerning routing of data through the third node to route data through the first node;

the plurality of interconnected nodes further including a fourth node distinct from the first, second, and third nodes, the fourth node having a plurality of data input ports, a plurality of data output ports, and a control signal output port; and

a logic associated with fourth node included as part of the routing logic being capable of sending a first control signal to the first node, the first control signal containing information concerning routing possibilities through the fourth, third and second nodes and the logic associated with the first node for routing of data through the first node depending at least in part on information concerning routing of data through the fourth, third and second nodes; and

the plurality of interconnected nodes including a fifth node distinct from the first, fourth, second, and third nodes, the fifth node having a plurality of data input ports, and a plurality of data output ports;

the fourth node sends a message to the fifth node;

the second node sends a second control signal to the fourth node;

the third node sends a third control signal to the fourth node;

the logic associated with the fourth node sends a non-blocking first control signal to the first node based on the third and second control signals;

the first node sends a message to the fifth node; and

the fifth node simultaneously receives messages into all of its input ports.

24. (New) An interconnect structure for carrying message packets consisting of a header and a payload with header indicating a target output port comprising:

a plurality of interconnected nodes including a first node having first and second input ports and first and second output ports;

a plurality of output ports that are assessable from the first input port but not from the first output port; and

a routing logic included within the interconnect structure to assure that when a first message arrives at the first input port and simultaneously a second message arrives at a second input port there is a path through the second output port to a target destination for the first message and a path through the first output port to a target destination for the second message,

wherein said routing logic assumes that the second message is not blocked from using the first output port and the first message is not blocked from using the second output port.